REMARKS

Claims 2 and 11 have been canceled, and the Abstract and claims 1, 3, 5 and 6 have been amended. No new matter was added. Accordingly, claims 1, 3, 5, 6, 8-10 and 12 are pending. In view of the amendment, the claims of the present application distinguish over the prior art of record. For this reason, Applicant submits that the present application is in condition for allowance.

I. Amendment of Abstract

> *In the Office Action, the Examiner states that "It is noted that the claimed invention is directed to a method and apparatus" and that "The Examiner suggests amending the abstract to reflect same".*

The Abstract has been amended to refer to a method and apparatus for depositing material to a substrate. No new matter was added. For example, see the title of the present application, as filed.

Approval of the amendment to the Abstract is respectfully requested.

II. Claim Rejections – 35 USC 112

> *In the Office Action, claims 1-3, 5, 6 and 8-12 are rejected under 35 USC 112, second paragraph, as being indefinite. More specifically, the Examiner requests clarification of the term "free surface" in claim 1 and "relative rotation" in claim 2.*

The term "free" has been deleted from the claims. Accordingly, Applicant respectfully submits that the rejection based on the use of the word "free" is now moot.

Independent method claim 1 has been amended to require the method step of causing "relative rotational movement" between the container and the arrangement of the shield and

beam of electrons. No new matter was added. For example, see claim 2, the drawing figure, and the description thereof in the present application, as filed.

As an example, the container (2) illustrated in the present application, as filed, can be rotated about an axis of rotation which is represented in the drawing figure of the present application by the vertical line extending between motor (3) and container (2). Thus, the motor (3) provides a means of causing "rotational movement" of the container (2) about an axis of rotation. In contrast, the positioning of the shield (7) and beam of electrons (represented by the arrow) in the embodiment shown in the drawing remains as shown in the drawing. Thus, the term "relative" is used in front of "rotational movement" to indicate that the container rotates "relative" to the arrangement of the shield and beam of electrons. Of course, claim 1 is of sufficient breadth to cover other embodiments in which the shield/beam arrangement rotates relative to a stationary container and in which the shield/beam arrangement and container both rotate relative to each other.

Independent claim 5 has been amended in a similar manner.

Applicant respectfully submits that the claims of the present application, as amended, are definite and point out and distinctly claim the subject matter Applicant regards as the invention. Accordingly, Applicant respectfully submits that the claims are in full compliance with 35 USC 112, second paragraph, and requests reconsideration and removal of the rejection.

III. Claim Rejections - 35 USC 103(a)

In the Office Action, claims 1-3, 5, 6 and 8-12 are rejected under 35 USC 103(a) as being obvious over U.S. Patent No. 4,882,198 issued to Temple et al.

The present invention relates to a continuous process for depositing material onto a substrate and to an apparatus used for this purpose.

As stated on page 1, lines 23-26, of the present application, as filed, a major disadvantage of electron beam evaporation with respect to the formation of semiconducting substrates bearing an array of organic light emitting diodes is the presence of so-called "secondary electrons" which are emitted from the material being evaporated upon direct impact by the beam of electrons fired by an electron gun. These so-called "secondary electrons" damage polymeric layers of organic light emitting diodes on which the material is intended to be deposited. Accordingly, the present invention is directed to solving this problem and protecting substrates from damage by "secondary electrons".

The container, or crucible, of the present invention is positioned partly under a shield and is rotated relative to the shield such that a part of the surface of the material in the container directly impacted by a beam of electrons is shielded from the substrate. At the same time, another part of the surface of the material is unshielded relative to the substrate. Evaporation of the material takes place from the unshielded part of the surface of the material by latent heat. During this deposition process, the shield prevents any secondary electrons emitted from the shielded part of the material (at the location where the beam of electrons directly impinges upon the material) from reaching the substrate.

Method claim 1 of the present application clearly requires a shield to be arranged to cover only **a portion** of the surface of the material which is to be deposited by evaporation onto a

substrate. For example, in the drawing figure of the present application, an upwardly-open container (2) enables the top surface (as shown in the drawing figure) of the material (4) to be exposed to a beam of electrons (represented by the arrow) emitted from an electron gun (5). The shield (7) permits the beam of electrons to directly impact upon a portion of the surface of the material (4) which is illustrated in the drawing as the right side of the material. The shield (7) does not extend over the opposite side of the material (ie., the left side as shown in the drawing), and the beam of electrons are prevented by the shield from directly impacting on the left side of the material. Thus, the shield (7) is able to protect the substrate from secondary electrons emitted from the impact of the beam on the right side of the surface of the material (4) because the location of impact is located underneath the shield. However, the unshielded left side of the material (4) evaporates as a result of latent heat, and this evaporated material is permitted to deposit onto the substrate since the shield does not extend over the left side of the material.

Claim 1 of the present application also requires "rotational movement" of the container/material "relative" to the shield/beam. Thus, areas of the surface of the material (4) having been directly impacted by the beam rotate from the left side of the material extending underneath the shield to the right side of the material where it is exposed to the substrate. At the same time, areas unshielded from the substrate move under the shield and are in position to be directed impacted by the beam. Deposition of the material (4) onto the substrate (8) is via evaporation from the unshielded, or left side (as shown in the drawing) of the surface of the material (4), and not from the right side of the surface of the material (4) located directly under the shield and exposed to the beam of electrons.

The purpose of this arrangement is best stated on page 2, lines 20-23, of the present application, as filed, which states:

> "The shield prevents secondary electrons from reaching the substrate, and material is evaporated from a portion of the surface not actually contacted by the beam of electrons but still subject to residual heat by virtue of having been so contacted previously."

Turning to the prior art reference, the Temple et al. patent relates to a system utilizing both plasma and electron beam evaporation. However, it is clear that Temple et al. fail to disclose, address, or acknowledge the problem with respect to "secondary electrons". Temple et al. simply provide no protection of their substrate from "secondary electrons". Accordingly, Applicant respectfully submits that a prima facie case of obviousness cannot be made in view of the Temple et al. patent.

In the Office Action, column 7, lines 10-19, of Temple et al. is referred to as disclosing a "spatter shield 40". This section of Temple et al. provides a discussion of FIG. 5 of the Temple et al. patent. As clearly illustrated in FIG. 5, spatter shield (40) is positioned to completely isolate the substrate (41) from the plasma and evaporant and prevent any deposition to the substrate. Thus, as stated by Temple et al.:

> "… a spatter shield 40 can be interposed in the vacuum chamber between the crucible 30 and substrate holder system 41 in order to confine the plasma and the evaporant species below this position of the spatter shield."

The purpose of the spatter shield of Temple et al. is to permit:

> "the overall evaporation process to be controlled from the standpoint of starting and stopping the actual evaporation onto substrates without turning off the electron beam gun 31 or the low voltage source 32."

Accordingly, the spatter shield (40) of FIG. 5 of Temple et al. provides a barrier between the material to be deposited and the substrate to effectively shutdown the process (without actually having to turn off the electron gun and low voltage source). Thus, when the spatter shield (40) is "interposed within the vacuum chamber", absolutely no material is deposited onto the substrate.

In contrast, the shield (7) of the present invention is not utilized to shutdown the deposition process; rather, the shield (7) covers only "a portion" of the surface of the material (4). This enables a portion of the material to be directly impacted by a beam of electrons and a different portion to evaporate and permit deposition onto the substrate. The purpose and intent of the shield of the present invention is to prevent "secondary electrons" from reaching and damaging the substrate.

Temple et al. clearly fail to disclose, suggest or teach a spatter shield (40) that covers only "a portion" of the material to be deposited onto a substrate. For example, the spatter shield (40) of Temple et al. illustrated in FIG. 5 completely covers and confines the plasma and evaporant. If this were not the case, the spatter shield (40) could not provide the desired function of starting and stopping deposition.

Accordingly, Applicant respectfully submits that Temple et al. teach away from the present invention in that all the plasma and evaporant must be confined relative to the substrate to completely shutdown the deposition process.

Further, Applicants respectfully submit that one of ordinary skill in the art would avoid modifying or changing the arrangement of the spatter shield (40) of Temple et al. because any other arrangement would destroy the purpose, intent and function of Temple et al.'s spatter shield which is used solely for the purpose of shutting down the deposition process (ie., a function equivalent to turning off the electron gun and low voltage supply).

Finally, claim 1 of the present application requires a step of causing relative rotational movement between the container and the shield/beam. Temple et al. clearly fail to disclose such a step or any reason for using such a step. In the arrangement of Temple et al., there is no common sense reason for one of ordinary skill in the art to rotate the shield. In addition, based

on the arrangement required by Temple et al., it is not possible to rotate the combination of the shield/beam relative to the container/material to be deposited.

Accordingly, Applicant respectfully submits that independent method claim 1 is patentable and non-obvious over the Temple et al. patent. Independent apparatus claim 5 includes similar limitations and should be patentable over Temple et al. for the same reasons. Thus, Applicant respectfully requests reconsideration and removal of the 103 rejection of the pending claims.

IV. Conclusion

In view of the amendments and remarks, Applicant respectfully submits that the rejections have been overcome and that the present application is in condition for allowance. Thus, a favorable action on the merits is therefore requested.

Please charge any deficiency or credit any overpayment for entering this Amendment to our deposit account no. 08-3040.

Respectfully submitted,
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